

are patentably distinguishable over the art of record and, therefore, should be allowed.

Claim 1, as amended, is directed to a flexible composite membrane that includes a selected quantity of a polymeric material that is blended with a selected quantity of a particulate material. The membrane includes a non-fiberized polymeric matrix wherein the particulate is substantially immobilized within the polymeric matrix. The outer surface of the membrane comprises a selectively permeable skin.

With respect to the art of record, Hagen et al. describe a "composite" article, including a matrix made from polytetrafluoroethylene (PTFE) fibrils and insoluble sorptive particles "emmeshed" in the matrix (column 5, lines 58-59). "Matrix," as used in Hagen et al., specifically refers to "an open structure entangled mass of microfibers" (column 3, lines 38-39). The article also includes a lubricant that is mixed with particles and the PTFE polymer.

In contrast, the membrane of Claim 1, as amended, is directed to a non-fiberized polymeric matrix wherein the particulate material is substantially immobilized within the non-fiberized matrix. Whereas the article in Hagen et al. apparently relies on the fibril matrix to hold the particulate material, in the membrane of Claim 1, the particulate is held by the non-fiberized polymeric material.

This difference is perhaps best seen by comparing the micrograph of Figure 1 in Hagen et al. with Figs. 15 and 20 of the

present application. Fig. 1 of Hagen et al. shows the matrix of elongated and entangled fibrils "in which are emmeshed" the particles (Column 5, lines 58-59). In contrast, as seen, in Figures 15 and 20 of the present application, the particulate material (which has been previously blended with the polymeric material), is held by a continuous matrix of the polymeric material. As seen, for example, in Fig. 20, the particulate material appears to be coated by the polymer and is, thereby, held by the polymer. Thus, structurally, the membrane of Claim 1 is significantly different from the fibril matrix of Hagen et al.

In addition, the Office Action states that at Column 12, lines 38-48 Hagen et al. disclose "skin layers of varying size and composition." In fact, what the cited passage of Hagen et al. discloses is that the article can be used as a single self-supporting sheet or a combination of sheets to form a laminate/stack or as a composite adhered to an inorganic or organic support." The laminate/stack can contain layers of composites with different porosities."

The term "laminate" typically refers to a structure made by "uniting superposed layers of one or more material." "Laminating" usually involves "bonding or impregnating superposed layers with resin and compressing under heat." (Webster's New Collegiate Dictionary, 1979).

The membrane of Claim 1 is not such a structure. The "skin" and inner portion of the membrane are not separately brought together as separate layers. The skin is formed together with the

rest of the membrane. The membrane is an integral membrane having an inner portion and an outer skin portion (pp. 16-17). Thus, the membrane of Claim 1 having an inner portion and an outer skin portion is not a "laminate/stack," as that term is understood, nor is the laminate/stack of Hagen et al. an example or even a teaching of such a membrane.

Turning now to Mahendran et al., that patent discloses a filtration membrane made from polyvinylidene difluoride (PVDF) polymer with a limited amount of calcined α -alumina particles. The filtration membrane of Mahendran et al. further includes a hydrophilic compound that is added to the polymer PVDF/ α -alumina complex. Although the α -alumina particles are described as being dispersed throughout the membrane, the membrane is formed by chemically reacting the α -alumina particles with the polymer and the hydrophilic agent. This is unlike the membrane of Claim 1 where the particulate material is (physically) held by and immobilized within the polymeric matrix without the need for a separate chemical reaction. For these reasons, the membrane of Claim 1 is not anticipated by Mahendran et al..

Pall et al. also disclose a filtration element made from fibrous materials. Accordingly, for the reasons discussed above in connection with Hagen et al., the filtration element is significantly different from the non-fiberized polymeric matrix of Claim 1. In addition, the particulate material in Pall et al. is coated onto a base which makes up the filtering element. In the membrane of Claim 1, the particulate material is initially blended

with the polymeric material. Thus, the membrane is cast or otherwise made with particulate already substantially dispersed throughout the polymer. Also, Pall et al. do not specifically disclose a "skin."

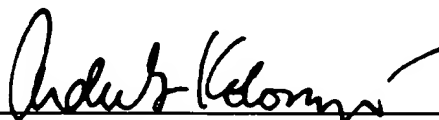
In addition to the foregoing amendments new Claims 40-45 have also been added. Claims 40-43 are directly or indirectly dependent on Claim 1. New Claim 44 is an independent claim directed to a flexible, composite membrane that includes a selected quantity of a polymeric material blended with a selected quantity of the particulate material wherein the particulate makes up more than 50%, by weight, of the blend. The membrane of Claim 44 includes a polymeric matrix wherein the particulate is substantially immobilized within the matrix. The outer surface of the membrane comprises a selectively permeable skin.

For the reasons set forth above, new Claim 44 is distinguishable over Hagen et al., Mahendran et al. and Pall et al. in that the membrane of Claim 44 (1) includes a particulate material blended with a polymeric material, (2) includes a non-fiberized polymeric matrix and (3) the outer surface of the membrane comprises a selectively permeable skin. In addition, Claim 44 is directed to a membrane wherein the particulate (blended with the polymeric material) makes up more than 50%, by weight, of the blend. This is plainly different from the teaching of Mahendran et al., which expressly states that the "concentration of α -Al in the dope is at least 1% by weight of the film and no more than 50% by weight (emphasis added).

Finally, the title of this application has been amended to
"COMPOSITE MEMBRANE WITH PARTICULATE MATTER SUBSTANTIALLY
IMMOBILIZED THEREIN."

For all of the above reasons, it is believed that Claims 1-8,
10-11, 37 and 40-45 are patentably distinguishable over the art of
record, and reconsideration and allowance of such claims are
respectfully requested.

Respectfully submitted,



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